CLAIMS

What is claimed is:

1. A flexible implantable brachytherapy treatment device, the device comprising a therapy delivery portion comprising a non-dissolving casing and one or more radiation sources fixed relative to the casing.

2. The device of claim 1, further comprising an elongate removal portion extending from the therapy delivery portion.

3. The device of claim 2, wherein the removal portion comprises an extension of the casing.

4. The device of claim 2, wherein the removal portion comprises a filament coupled to the casing.

5. A removably implantable brachytherapy treatment device, the device comprising:

a therapy delivery portion comprising a flexible casing and one or more radiation sources fixed relative to the casing; and

at least one non-dissolving tail portion extending from the therapy delivery portion.

6. The device of claim 5, wherein the tail portion comprises an extension of the casing.

7. The device of claim 5, wherein the tail portion comprises a filament coupled to the therapy delivery portion.

8. The device of claim 5, wherein the therapy delivery portion comprises a support member operable to hold the one or more radiation sources.

9. The device of claim 8, wherein the support member partially surrounds at least a portion of the one or more radiation sources.

10. A brachytherapy treatment device operable for both implantation into, and subsequent removal from, a target tissue region of a body, the device comprising:

a therapy delivery portion comprising one or more radioactive sources fixed relative to a casing, the casing operable to be positioned in direct contact with the target tissue region; and

at least one non-dissolving flexible tail portion extending from the therapy delivery portion.

11. The device of claim 10, wherein the flexible tail portion comprises an extension of the casing.

12. The device of claim 10, wherein the flexible tail portion comprises an elongate filament attached to the therapy delivery portion.

13. The device of claim 12, wherein the elongate filament comprises a surgical suture.

14. The device of claim 10, wherein the casing comprises heat-shrinkable tubing operable to substantially contract around the one or more radioactive sources.

15. The device of claim 10, wherein a portion of the casing comprises a radiation attenuating material.

16. The device of claim 15, wherein the radiation attenuating material comprises a material co-extruded with the casing.

17. The device of claim 10, wherein the therapy delivery portion further comprises a support member.

18. The device of claim 17, wherein the support member is operable to at least partially attenuate radiation.

19. The device of claim 17, wherein the support member is straight.

20. The device of claim 17, wherein the support member is curved.

21. The device of claim 20, wherein the support member is arc-shaped.

22. The device of claim 17, wherein the support member is enclosed in the casing.

23. The device of claim 10, wherein the therapy delivery portion further comprises one or more anchors operable to secure the therapy delivery portion relative to the target tissue region.

24. A brachytherapy treatment device for implanting a plurality of radioactive sources into a target tissue region of a body, and for removing the plurality of radioactive sources at the completion of brachytherapy, the device comprising:

a therapy delivery portion comprising a heat-shrinkable casing operable to securely retain the plurality of radioactive sources;

a non-dissolving, first flexible tail portion extending from a first end of the therapy delivery portion; and

a non-dissolving, second flexible tail portion extending from a second end of the therapy delivery portion.

25. The device of claim 24, wherein at least one of the first flexible tail portion and the second flexible tail portion comprises an integral extension of the heat-shrinkable casing.

26. The device of claim 24, wherein at least one of the first flexible tail portion and the second flexible tail portion comprises a filament attached to the therapy delivery portion.

27. A device for delivering brachytherapy to a target tissue region of a body, the device comprising an elongate, non-dissolving flexible casing adapted to securely hold therein a plurality of radioactive sources.

28. The device of claim 27, wherein the flexible casing comprises a heat-shrinkable plastic tube.

29. The device of claim 28, wherein the plastic tube comprises a therapy delivery portion containing the plurality of radioactive sources, and a tail portion extending away from the therapy delivery portion.

30. The device of claim 29, further comprising a locking member securable along the tail portion.

31. A device for delivering brachytherapy to a lesion of the breast, the device comprising a non-dissolving flexible casing adapted to securely hold therein a radioactive source.

32. A brachytherapy delivery apparatus, comprising:

means for simultaneously implanting, in a parallel array, a plurality of catheters into a target tissue region, wherein each catheter of the plurality of catheters is operable to receive one or more radioactive sources.

33. A garment for attenuating radiation from an implantable brachytherapy device, the garment comprising: a fabric portion operable to cover an area surrounding the brachytherapy device; and a radiation attenuating material associated with the fabric portion.

34. The garment of claim 33, wherein the garment is a chest covering.

35. The garment of claim 33, wherein the radiation attenuating material is lead.

36. A kit for providing brachytherapy treatment, the kit comprising:

a removably implantable elongate brachytherapy device comprising:

a therapy delivery portion comprising a casing member operable to securely retain therein one or more radioactive sources; and

a non-dissolving flexible tail portion extending from the therapy delivery portion;

a catheter for implanting the brachytherapy device within a target tissue region; and

a locking member for securing the flexible tail portion relative to the target tissue region.

37. The kit of claim 36, further comprising a garment comprising a partial body covering having a radiation attenuating material.

38. The kit of claim 37, wherein the garment is operable to cover a portion of a chest of a patient.

39. A kit for delivering brachytherapy to a target tissue region of a body, the kit comprising:

a removably implantable elongate brachytherapy device comprising:

a therapy delivery portion;

one or more radioactive sources secured to the therapy delivery portion; and

at least one non-dissolving flexible tail portion extending from the therapy delivery portion; and

catheter means for delivering the brachytherapy device to the target tissue region.

40. A kit for delivering brachytherapy to a target tissue region of a body, the kit comprising:

a removably implantable elongate brachytherapy device comprising:

a therapy delivery portion;

one or more radioactive sources secured to the therapy delivery portion; and

at least one non-dissolving flexible tail portion extending from the therapy delivery portion; and

a catheter for delivering the brachytherapy device to the target tissue region.

41. The kit of claim 40, wherein the catheter comprises a needle operable to pierce the body.

42. The kit of claim 40, further comprising an obturator operable to pierce the body, the obturator insertable within the catheter.

43. The kit of claim 40, further comprising a pusher member insertable within the catheter.

44. The kit of claim 40, further comprising a locking member operable to secure the at least one non-dissolving flexible tail portion relative to the body.

45. A catheter for implanting at least one radioactive source into a target tissue region of a body, the catheter comprising a radiotransparent portion and a radioabsorptive portion, wherein the radioabsorptive portion extends substantially along a longitudinal length of a dose delivery portion of the catheter.

46. The catheter of claim 45, wherein the radioabsorptive portion is operable to attenuate radiation from the at least one radioactive source when the at least one radioactive source is located in the dose delivery portion of the catheter.

47. The catheter of claim 45, wherein the catheter is operable to receive a high dose radiation (HDR) source.

48. The catheter of claim 45, wherein the catheter is operable to receive a low dose radiation (LDR) source.

49. A catheter assembly for delivering one or more radioactive sources to a target tissue region of a body, the catheter assembly comprising:

a first catheter member; and

a second catheter member positionable within the first catheter member, the second catheter member operable to extend outwardly from an opening at or near a distal end of the first catheter member such that an axis of the second catheter member intersects an axis of the first catheter member.

50. The catheter assembly of claim 49, wherein the axis of the first catheter member forms an angle with the axis of the second catheter member ranging from greater than about 0 degrees to about 90 degrees.

51. The catheter assembly of claim 50, wherein the angle is about 5 degrees to about 35 degrees.

52. A catheter assembly for delivering a high dose radiation (HDR) source to a target tissue region of a body, the catheter assembly comprising:

a catheter shaft comprising a distal end and a proximal end;

an inflatable balloon coupled to the catheter shaft between the distal end and the proximal end; and

a dose delivery lumen extending along the catheter shaft between the proximal end and the distal end;

wherein a dose delivery portion of the catheter shaft surrounded by the inflatable balloon comprises a radioabsorptive portion.

53. The catheter assembly of claim 52, wherein the radioabsorptive portion is operable to attenuate radiation along the dose delivery portion of the catheter shaft.

54. The catheter assembly of claim 52, further comprising an inflation lumen extending along the catheter shaft between the inflatable balloon and the proximal end.

55. The catheter assembly of claim 52, further comprising a vent system, the vent system comprising one or more vents positioned along an outer surface of the inflatable balloon; and one or more vent lumens associated with the catheter shaft, wherein the one or more vents are in fluid communication with the one or more vent lumens.

56. A catheter assembly for delivering a high dose radiation (HDR) source to a target tissue region of a body, the catheter assembly comprising:

a catheter shaft comprising a distal end and a proximal end;

an inflatable balloon coupled to the catheter shaft between the distal end and the proximal end; and

a dose delivery lumen extending between the inflatable balloon and the proximal end of the catheter shaft; and

a vent system comprising:

one or more vents positioned along an outer surface of the inflatable balloon; and

one or more vent lumens extending between the proximal end of the catheter shaft and the one or more vents.

57. The catheter assembly of claim 56, further comprising an inflation lumen extending along the catheter shaft between the inflatable balloon and the proximal end.

58. A system for implanting one or more radiation sources into a target tissue region of a patient, the system comprising:

a patient locating surface; and

an adjustable catheter guiding apparatus coupled to the locating surface, wherein the adjustable catheter guiding apparatus comprises:

a first compression member having a catheter guiding template associated therewith, and a second compression member, wherein the first compression member is movable relative to the second compression member.

59. The system of claim 58, further comprising a cartridge receiver associated with the first compression member, the cartridge receiver operable to receive a pre-assembled cartridge comprising a plurality of catheters positioned in a predetermined array.

60. The system of claim 59, wherein the cartridge comprises a plunger member operable to advance the plurality of catheters into the target tissue region.

61. The system of claim 58, wherein the catheter guiding template has a predetermined number and pattern of openings based upon a size or volume of the target tissue region.

62. The system of claim 61, wherein the catheter guiding template comprises 5 openings.

63. The system of claim 61, wherein the catheter guiding template comprises 9 openings.

64. The system of claim 61, wherein the catheter guiding template comprises 13 openings.

65. The system of claim 58, further comprising an imaging device operable to locate the catheter guiding apparatus relative to the target tissue region.

66. The system of claim 59, wherein the catheter guiding template forms a portion of the cartridge.

67. A system for implanting one or more radiation sources into a target tissue region of a body, the system comprising:

a stereotactic table; and

an adjustable catheter guiding apparatus coupled to the stereotactic table, wherein the adjustable catheter guiding apparatus comprises:

a first compression member having a catheter guiding template associated therewith, and a second compression member, wherein the first compression member is movable relative to the second compression member.

68. A system for implanting a plurality of brachytherapy devices into a target tissue region of a body, the system comprising:

a catheter guiding template;

a cartridge receiver associated with the catheter guiding template; and

a pre-assembled cartridge comprising a plurality of delivery catheters arranged in a fixed relationship, wherein the cartridge receiver is operable to receive the pre-assembled cartridge.

69. A method of providing brachytherapy to a target tissue region of a body, the method comprising:

providing an elongate brachytherapy device comprising a therapy delivery portion with one or more radioactive sources secured thereto, and a non-dissolving flexible tail portion extending from the therapy delivery portion;

locating the therapy delivery portion at a static position within the target tissue region, wherein the flexible tail portion protrudes outside the body; and

delivering brachytherapy with the one or more radioactive sources.

70. The method of claim 69, further comprising removing the brachytherapy device from the target tissue region.

71. The method of claim 70, wherein removing the brachytherapy device comprising applying a pulling force to the flexible tail portion that protrudes outside the body.

72. The method of claim 69, further comprising securing the brachytherapy device relative to the target tissue region.

73. The method of claim 72, wherein securing the brachytherapy device comprises fixing a locking member along the flexible tail portion that protrudes outside the body.

74. The method of claim 72, wherein securing the brachytherapy device comprises:

folding the flexible tail portion that protrudes outside the body so that the flexible tail portion conforms to a contour of the body; and

securing the flexible tail portion to the body.

75. The method of claim 69, wherein the target tissue region comprises breast tissue.

76. A method of providing brachytherapy to a target tissue region of a body, the method comprising:

providing an elongate brachytherapy device comprising:

a therapy delivery portion comprising one or more radioactive sources secured thereto;

a first flexible tail portion extending from a first end of the therapy delivery portion; and

a second flexible tail portion extending from a second end of the therapy delivery portion;

locating the therapy delivery portion at a static location within the target tissue region such that the first flexible tail portion extends outside a first puncture in the body and the second flexible tail portion extends outside a second puncture in the body; and

delivering brachytherapy to the target tissue region with the one or more radioactive sources.

77. The method of claim 76, further comprising securing one or both of the first flexible tail portion and the second flexible tail portion relative to one or both of the first puncture and the second puncture, respectively.

78. The method of claim 77, wherein securing the one or both of the first flexible tail portion and the second flexible tail portion comprises securing a locking member on one or both of the first flexible tail portion and the second flexible tail portion adjacent one or both of the first puncture and the second puncture, respectively.

79. The method of claim 76, further comprising removing the brachytherapy device from the target tissue region by applying a pulling force to the first flexible tail portion or the second flexible tail portion.

80. A method of providing brachytherapy to a target tissue region of a body, the method comprising:

simultaneously advancing multiple catheters into a target tissue region; and

delivering one or more radiation sources through at least one catheter of the multiple catheters.

81. The method of claim 80, further comprising removing the multiple catheters from the target tissue region.

82. The method of claim 81, wherein removing the multiple catheters comprises removing the multiple catheters with the one or more radiation sources therein.

83. The method of claim 80, wherein the one or more radiation sources comprise a high dose radiation (HDR) source.

84. The method of claim 80, wherein the one or more radiation sources comprise a low dose radiation (LDR) source.

85. A method for delivering brachytherapy to a lesion of the breast, the method comprising:

implanting a radioactive source at or near the lesion;

delivering brachytherapy; and

removing the lesion, wherein the radioactive source is removed prior to or during removal of the lesion.